Space Weather Forecast

Issued on Sunday, 16 June 2024 at 00:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor geomagnetic storm early Day 1 (16 Jun). Isolated M-class flares (R1-R2 radio blackouts) likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity remained Moderate with an isolated low-end Moderate-class X-ray flare peaking at 15/0627UTC from the largest and most complex sunspot group in the southeast quarter of the Sun. This is one of seven sunspots on the current Earth-facing side.

The nominally most complex and threatening groups all lie in the eastern solar hemisphere at present, and foremost amongst these is the aforementioned complex region. This has undergone significant proliferation of its intermediate spots, with these increasing the overall area (often a precursor to greater activity). Also of note is a second sunspot group in the northeast, which has also developed intermediate spots to become a more compact group from its previously less noteworthy 'open' designation. Other groups were less developmental in the period, and amongst them is a newly-developed region in the northwest.

A coronal mass ejection (CME) observed leaving the Sun due to a 'filament eruption' has been analysed as missing Earth. No other Earth-directed CMEs were in evidence.

Solar Wind / Geomagnetic Activity: Solar winds, initially at background levels, rose to slightly elevated levels upon the arrival of a forecast CME, peaking at 482 km/s but generally averaging around 420-450 km/s. The Interplanetary Magnetic Field (IMF) increased from weak to moderate levels after the CME arrival. The important north-south component also reached moderate levels. Geomagnetic activity was Quiet at first (Kp1-2), before reaching Active (Kp4) levels for the 15/1200-1500 period. It then fell to Unsettled (Kp3) for the rest of the period.

Energetic Particles / Solar Radiation: No solar radiation storms were detected and proton counts remained comfortably below the S1/Minor solar radiation storm threshold - now very close to resting background levels after enhancements last UTC working week.

Four-Day Space Weather Forecast Summary

Solar Activity: Further isolated Moderate-class flares are likely, with a slight chance of Strong-class flares. Any significant flares remain most likely from the more complex eastern solar hemisphere sunspot regions considering their magnetic complexity and growth. No significant regions are expected to depart or rotate onto the visible side of the Sun during the period.

Solar Wind / Geomagnetic Activity: Ongoing effects of the recent CME arrival are likely at first, with solar winds expected to slowly wane from their current slightly elevated levels. Unsettled to G1/Minor geomagnetic storm intervals are possible through early Day 1 (16 Jun). A high speed stream from a coronal hole may connect to Earth during Days 2 and 3 (17-18 Jun).

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Overall, Unsettled to G1/Minor storm intervals (Kp3-5) are possible initially on Day 1 (16 Jun) due to lingering CME effects. Geomagnetic activity should then subside for a time back to Quiet to Unsettled levels (Kp2-3), ahead of a possible return to Active (Kp4) into the UTC working week on arrival of any fast wind from CH45/+.

Energetic Particles / Solar Radiation: Solar radiation levels are expected to very soon return to resting background. The chances of new enhancements are low given the more complex spots are situated in the less well-connecting eastern solar hemisphere for some days yet.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	5	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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